Results: Steady state (≥ 5 days maintenance PCZ) concentrations (n = 34) were evaluated in 24 BMT patients (median age 62 years (22–78), 45% female), with 20 treated prophylactically (maintenance 300 mg daily), and 4 dosed with treatment intent (400 mg daily with 1 patient adjusted to 300 mg after a level of 4.3). An average weight-based dose of 4.13 mg/kg yielded average levels of 1.53 mcg/mL. Ranges of 3 to 5 mg/kg (16/24 patients) led to average levels of 1.37 mcg/mL (0.5 – 2.5). Higher levels (2.32 mcg/mL (0.8–4.3)) were seen in doses >5 mg/kg (6/24 patients). Doses < 3 mg/kg yielded low levels (0.4) (2 patients). Of 20 patients on prophylaxis, 1 developed a probable IFI with a therapeutic PCZ level. Of 4 patients on treatment, 2 improved and 2 died (both of progressive AML), all with therapeutic/supratherapeutic levels.
Conclusion: Therapeutic drug monitoring has previously been used for PCZ treatment and prophylaxis. Levels ≥ 0.7 mcg/mL in prior OS studies were associated with successful prophylaxis vs. IFI breakthrough. In this adult BMT population, levels exceeded this threshold, and were consistent with treatment doses or higher. We postulate that weight-based dosing may give adequate prophylactic levels on lower total mg doses while offering benefits of reduced cost and avoided toxicities. Further associations of PCZ levels with efficacy and adverse events are warranted.

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A Study of Dietary Intake and the Relationship to Neutrophil Engraftment Among Outpatient Hematopoietic Stem Cell Transplant Patients with Multiple Myeloma

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Introduction: At Mayo Clinic (MN) autologous hematopoietic stem cell transplants (HSCT) for Multiple Myeloma (MM) are performed on an outpatient basis and patients consume only an oral *ad libitum* diet. Current literature suggests that calorie and protein needs following HSCT exceed basal requirements, despite lack of evidence that this improves outcomes.
Objectives: To describe the calorie and protein intake of MM patients receiving outpatient autologous HSCT, and explore relationships between oral intake and neutrophil engraftment.
Methods: Intake information from patient food records were reviewed retrospectively for adult MM patients who received auto HSCT from 2010 through 2012. Descriptive statistics were used to describe the demographic and clinical characteristics. Pearson's correlations were utilized to explore relationships between calorie and protein intake and engraftment.
Results: n=230 was predominantly male (56.1%) with mean age of 60.6 years (range 35-75 years). At the time of transplant, 77.8% had a BMI classified as either overweight or obese. The mean calorie intake of the sample was 1530.4±452.1 per day (18.8±6.3 kcal/kg/day) and mean protein intake of 52.7±20.0 grams per day (0.65±0.26 g/kg/day). Mean time to neutrophil engraftment was 15.1±2.5 days (range 10-23 days). There were statistically significant weak positive correlations between calorie (r=+0.187, p=0.004) and protein intake (r=+0.199, p=0.002) and engraftment, but not clinically meaningful differences given many other variables affecting engraftment.

	Mean±SD	Median	Range
Mean daily calorie intake (kcal)			
Total	1530.4±452.1	1516.0	253.0–2697.0
Kcal/kg	18.8±6.3	18.5	3.2–38.5
Mean daily protein intake (grams)			
Total	52.7±20.0	50.7	4.5–109.4
g/kg	0.65±0.26	0.63	0.06-1.48
Time to neutrophil engraftment (days)	15.1±2.5	15.0	10-23

Conclusions: Compared to the general population, study subjects had a higher prevalence of overweight or obesity. A majority of patients did not meet estimated basal energy or protein requirements; however there was no correlation between calorie or protein intake and engraftment timing that could be considered clinically relevant. Calorie & Protein Intake and Timing of Neutrophil Engraftment in patients was considered.

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Incidence and Risk Factors of Bacterial Infections in Children and Adolescents Following Allogeneic Hematopoietic Stem Cell Transplantation

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Introduction: Bacterial infections are a serious complication following allogeneic hematopoietic stem cell transplantation (HSCT). There are limited data on the incidence and risk factors in pediatric recipients.
Patients and Methods: We retrospectively reviewed medical records of all pediatric patients who received allogeneic HSCT between January 2008 and April 2014 at King Hussein Cancer Center (KHCC) in Jordan. All bacterial infections including blood and non-blood related were included. No prophylaxis antibiotic was routinely used. Piperacillin and Amikacin were used empirically for fever episodes during the first 100 days following HSCT.
Results: A total of 200 pediatric patients were identified, with median age of 9 year (2 month-27 year). Sixty percent (n=119) were males. One hundred and nineteen patients (60%) had non-malignant diseases. Peripheral blood (PB) was the stem cell source in 110 (55%), 69 (34.5%) bone marrow and 21 (10.5%) cord blood. Sixty nine percent received myeloablative conditioning (n=137), 26% reduced intensity (n=52) and 5% no conditioning regimen (n=11). One hundred eighty two (91%) were matched-related (140 were HLA identical siblings and 42 were other family donors). A total of 151 bacterial infections were documented in 77 patients (39%). Gram positive (GP) isolates were slightly more prevalent (52%) than gram negative (GN) (48%). One hundred and five episodes were isolated from blood stream (70%), 38 from skin, nasal and throat swabs (24.7%), and 8 from urine (5.3%). The GP isolates were more prevalent from blood stream, while GN were the prevalent ones at other sites (p=0.001). Coagulase negative staphylococcus (CONS) was the most predominant isolate in all sites (33%), followed by Escherichia coli (15%). Most of the bacterial infection episodes (60%) occurred prior to neutrophil engraftment. Eight deaths

(10.3%) were attributed to bacterial infection. Risk factors associated with higher risk of bacterial infections included age < 2 years at transplantation (p=0.001), use of PB (p=0.038), myeloablative conditioning (p=0.027), mismatched or unrelated donor (p= 0.002), family donors other than identical siblings (p=0.046), use of TPN (p=0.046), and morphine use for more than 5 days (p=0.011) due to significant mucositis. In a multivariate analysis; age at transplantation < 2 years (HR=6.834; 95% CI 1.528-30.572; p=0.0119) was the only factor associated with higher risk for bacterial infection post HSCT.

Conclusion: Bacterial infections are common following allogeneic HSCT in children and adolescents not receiving antibiotic prophylaxis and are associated with significant risk of mortality. Children below 2 years of age are at higher risk. We have prospectively implemented an antibiotic prophylaxis regimen in an effort to decrease bacterial infections.

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Incidence of CMV Reactivation and Infection in Children and Adolescents Following Allogeneic Hematopoietic Stem Cell Transplantation in High CMV Exposure Population

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Introduction: Cytomegalovirus (CMV) infection is a known complication following allogeneic hematopoietic stem cell transplantation (HSCT). The method and duration of CMV monitoring are center-dependent, and no standards on the effective duration of CMV surveillance are clearly reported in the literature especially in areas with high CMV exposure.

Patients and Methods: We retrospectively reviewed the medical records of all consecutive patients who received allogeneic HSCT between January 2008 and April 2014 at King Hussein Cancer Center (KHCC) in Jordan. The CMV infection was monitored using pp65 antigenemia test weekly from time of neutrophil engraftment until day 100 post transplantation. Treatment with gancyclovir was initiated when two consecutive positive antigenemia tests of more than two cells per 250 WBC were documented. All patients received leukofiltered and irradiated blood products.

Results: A total of 200 patients were identified, with median age of 9 year (2 months-27 year). Sixty percent (n=119) were males. One hundred and nineteen patients (60%) had non-malignant diseases. Peripheral blood (PB) was the stem cell source in 110 (55%), 69 (34.5%) received bone marrow and 21 patients (10.5%) received cord blood. Sixty nine percent received myeloablative conditioning (n=137), 26% reduced intensity (n=52) and 5% no conditioning regimen (n=11). Ninety-one percent (n=182) were matched-related (140 were HLA identical siblings and 42 were other family donors). Ninety three percent of our patients (n=186) and 83% of donors (n=166) were CMV sero positive. Thirty-five patients (17.5%) needed preemptive therapy for CMV reactivation at a median of 33 days (14-70) following transplantation. The median number of cells was one cell per 250 WBC (1-2298). Ten patients continued to have positive CMV antigenemia on day 70, and 3 on day 100, while only one patient had new episode of CMV reactivation after 70 days post transplantation. Two patients (1%) developed CMV disease (pneumonitis and colitis). In univariate analysis, patients who received ATG (p=0.005), non-sibling related donors (p=0.037), mismatched or unrelated donor transplants (p=0.007), PB (p=0.019), and myeloablative conditioning (p=0.004) were at higher risk for developing CMV reactivation. In multivariate analysis; ATG use (HR=2.87; 95% CI 1.026-8.025; p=0.0445) and the use of mismatched related or unrelated donor (HR=11.11; 95% CI 1.87-66.67, p=0.0081) was associated with increased risk of CMV reactivation.

Conclusion: The incidence of CMV reactivation following allogeneic HSCT in children and adolescents within high CMV exposure population is low. Shortening the duration of CMV surveillance may be feasible. Use of ATG in the preparative regimen and those receiving mismatched or alternative donor transplants are at the highest risk for CMV reactivation.

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Predictors and Outcomes of Intensive Care Utilization in Patients Undergoing Allogeneic Hematopoietic Stem Cell Transplant at Mayo Clinic, Florida

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To understand predictors and outcomes of ICU admission we conducted a retrospective study of consecutive patients undergoing allogeneic HCT over a 10 year period 1/2002 - 12/2012. Information about patient demographics, disease characteristics, disease status, co-morbidities, conditioning regimen, donor characteristics and ICU interventions were collected. Single and multivariable analysis was used to assess associations between various characteristics and outcomes. Survival probabilities were estimated using the Kaplan-Meier method.

118 patients underwent first transplant. Median age was 51 (range 20-72); 81% had leukemia. 39 (33%) patients were admitted to the ICU within the first 100 days; 22 within 14 days of transplant. Median survival of these patients was 54 days (95% CI 14-189) compared to 4.5 years for patients not admitted to ICU. In single variable analysis, TBI (p=0.04), URD (p=0.03), mismatched donor (p=0.009)*, and not in CR (p<0.001)* were associated with increased likelihood of ICU admission (*significance in multivariable analysis). HCT-CI score was not found to be associated with ICU admission.

Increased risk of death in ICU patients was associated with male sex (p<0.001), HCT-CI defined liver dysfunction (p=0.003) and vasopressor administration (p=0.020) in single variable analysis. Adjusting for sex (HR=4.63), vasopressor administration (HR 4.54, p=0.001) and number of ICU interventions within 48 hours of admission (HR 3.48 [>1 vs 0], p= 0.026) were associated with increased risk of death. APACHE score was not associated.

Compared to females, male patients had higher rates of myeloablative regimens (71% v 56%), TBI (48% v 33%), URD HCT (76% v 44%) and vasopressor use (33% v 24%) as well as lower rates of CR (19% v 28%) at time of transplant.

ICU admission was associated with an increased risk of death (HR = 3.70, 95% CI 2.26-6.06, p <0.001). ICU survivors tended to have worse long-term outcomes. Among 18 patients alive at day 90, 12 survived to one year (67%) compared to 61 out of 79 (77%) who never required ICU admission (p=0.84). Further analysis to understand the causes of worse outcomes